

## INDUSTRIAL LINKAGES AND RURAL INDUSTRIALIZATION: A CASE STUDY OF HENAN PROVINCE, CHINA

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**ABSTRACT:** The fast growth of rural industry in China has generated regional development of large rural areas. What role does industrial linkages play in Chinese rural industrialization? This is a same question as the relation between industrial linkages and regional development which has been discussed for decades and no final conclusion reached. The paper pursues the discussion and focuses on rural areas in China with special reference to Henan Province. On the basis of data from an investigation on nearly 200 industrial enterprises, this study emphasizes that the linkages play a very important role in spreading development of industry in rural areas. It is recommended that the national policies should prompt industrial linkages to upgrade the technological level of rural industry and to integrate rural industry with urban industry.

**KEY WORDS:** industrial linkages, rural industrialization, regional development

Since the early 1980s China's rural economy has gained rapid growth, among which, rural industry played a very important role. For example, the average annual growth rate of rural industry reached 27% in the period of 1986-1990, and the gross value of rural industry output in 1991 totaled 850,000 million yuan (RMB), which accounted for 1/3 of the gross value of national industrial output. In light industry, the rural contributed even near 1/2 of the nation's total. Some of the country's biggest enterprises, such as the largest refrigerator plant, the largest electric fan factory, the largest silk textile and dyeing mill, and the largest heating facility factory, are all township and village enterprises.

The rapid growth of China's rural industry is a striking and unique phenomenon in many ways in the world<sup>[1]</sup> so it has attracted many scholars' attention, both at home and abroad. Most of these works, however, dealt with the broader subject of rural industry, only few scholars conducted detailed fieldwork<sup>[2,3]</sup>, especially concerned the enterprise surveys and interviews. To overcome the limitations of using statistical data alone, the particular at-

tention of this paper will be given to the relationship between industrial linkages and rural industrialization in the light of an investigation on nearly 200 enterprises in the rural area of Henan Province.

## I. INTRODUCTION

Industrial linkages can be interpreted as the contacts and flows of information and materials between two individuals<sup>[4]</sup>. In practice, good flow service connection, technology transfer and fund circulation should be all included in the linkage study.

Different perspectives have been adopted by scholars to understand the relationship between industrial linkages and regional development. Perroux, for example, considered that interindustrial linkages were necessary conditions for economic growth<sup>[5]</sup>, and the lack of linkages with other local industries can not generate great multiplier effect in the concerned area<sup>[6]</sup>. The dependency theorists, however, hold different viewpoints. A. Frank has argued that interregional linkages caused a flow of surplus value from local, peripheral producers to regional, national and even world centers<sup>[7]</sup>. Szentes maintained that the interindustry relations and linkage effects in the Third World can not be enlarged. As the development of the core regions progresses, there is an increasing income from the periphery to the core.

The above contrasting views leave us a point of study that a thorough quantitative analysis, in particular from detailed surveys and interviews with industrial enterprises, would be a very important research topic. Our purpose in the paper is, by looking at the rural industrial growth, to prove that the linkages play a key role in the development of underdeveloped rural areas in China.

There are three reasons to select Henan Province as a case study: 1) The provincial government provided funds for the study. 2) Due to its central geographical location in China Henan represents average level of development in the central zone and has most of inland features of development. 3) Henan is one of the provinces with typically traditional Chinese culture (with yellow earth, the Huanghe (Yellow) River, and most civilized society in Middle Ages).

In order to conduct considerable in-depth fieldwork in a relatively short time, it was decided to select 5 counties in Henan Province, which represent different development levels and various geographical conditions. According to data of gross value of rural industrial output (GVRIO), 118 counties and county-level cities in Henan Province were divided into 5 groups. In each group we chose one sample county with reference to gross value of industrial output per head and geographical background of development, in addition to considering accessibility under given condition of limited time and research fund (Table 1).

In each sample county one best township and two best villages in terms of rural industry performance were selected as our fieldwork areas. We then designed a surveying sheet

which includes 88 questions concerning issues from general data to specific information. By using the sheet 178 enterprises in 5 townships and 10 villages were surveyed.

Besides the sample areas, we also visited four special villages with more than 100 million yuan of GVRIO in 1991 information gathered through the visits were also used in the study.

**Table 1 Data source from 5 counties, Henan Province**

County	GVRIO per head in 1991 (yuan)	Geographical background	Enterprises surveyed
Gongyi	2035.7	Hills/ near Zhengzhou, Luoyang	52
Mengxian	1339.7	Plain/ developed agriculture	29
Xinan	541.4	Mountains/ rich mine resources	21
Weishi	340.0	Plain/ better agriculture	42
Ningling	99.2	Plain/ poor resources/ general agriculture	34
Total			178

Sources: Henan Town and Village Enterprise Bureau and the author's work.

## II. TYPES OF INDUSTRIAL LINKAGES

The results from the surveys and interviews show that 5 types of linkages are very significant in the development of rural industry:

### 1. Mining-Processing Linkage

This linkage mainly exists between the areas with rich natural resources and relatively developed industry. In some areas with rich natural resources, most industrial enterprises are involved in mining and semiprocessing sector. Their products mainly supply the enterprises outside the areas. So this linkage is mainly inter-regional although intra-regional linkage can also be seen in some cases. For example, Cangtuo Township of Xinan County had 54 enterprises. They all mined coal and sulphur ore, and most (95%) of their products were sold outside the county. In Miaotou Village of the County, 7 of 10 enterprises are based on the local raw materials. After mining products being processed, they are supplied to the enterprises nationwide. Generally speaking, in the mountainous areas serious transportation problems block the development of the linkage to great extent.

### 2. Agricultural Products-Processing Linkage

Commercial agricultural products can be either processed in the producing areas, or

shipped to processing plants somewhere else. But in terms of the rural industry concerned, this linkage is more intra-regional because the commercial agricultural areas usually have better conditions for industrial start-up and agricultural commodities might be the first concern for the entrepreneurs as industrial inputs. In the agricultural product processing enterprises surveyed, the sources of major materials are all within the counties. In Goucun Township of Mengxian County most villages take agricultural product processing as the key industry, 95% of the raw materials (grain, fruits, meats and wheat straw) were from the county.

The products of animal husbandry and sideline, which belong to broad definition of agriculture, are mostly processed in the factories outside the growing areas which, due to remoteness, are usually backward. Sangpo Village of Mengxian County, for instance, has 30 factories for fur processing. Most factories import their raw fur from other counties and provinces.

### **3. Parts or Semifinished Products-Processing Linkage**

Some small scale enterprises mainly produce parts or semifinished products to supply large factories. This linkage can either exist between rural and urban enterprises, or between rural industries. Generally it often in the former situation. The case has been seen in Gong County, which is located in the midway between the two major industrial cities, Luoyang and Zhengzhou, and has a very good transport connection with cities. Industries for parts and semifinished products developed very fast in the county.

### **4. Capital Linkage**

This linkage occurs when a rural industrial enterprise receives (or sends) money and equipments from (or to) another industrial enterprise. The typical cases are joint-venture investments and share control. The survey's data indicated that the linkage mostly occurred between industrial enterprise and financial agency within a county although there are a few cases of exception. For example, Henan Kaixiang Ltd. at Donghan Village of Mengxian County obtained 2 million foreign loan to process local corn for corn flour, and Nanjie Village of Linying County attracted Japanese investment for a joint-venture color printing firm.

### **5. Technology Linkage**

The technological cooperation and supervision, and technique transfer are all included in this linkage. The linkage is generally extended in a large geographical area, not only beyond the county or the province's boundary, but also across the country. In the survey data, 40% of 178 enterprises have obtained technological supervision from the urban enterprises and research institutions. Generally speaking, the rural enterprises are acceptors of

the linkage.

A number of the technology linkages in the survey's enterprises are influenced by personal contacts among classmates, fellow villagers, relatives, and friends. The data show that this sort of linkage amounted to 30% of the total rural-urban technology linkage. Weakness clearly exists in this condition as some advanced technology can not be used because of lack of the connection, on the contrary, obsolete techniques are still used in some enterprises.

### III. INDUSTRIAL LINKAGES AND DEVELOPMENT OF RURAL INDUSTRY

From the survey's data the relationship between the development level of rural industry and industrial linkages is distinguishable. As can be seen from Table 2, the enterprises surveyed in the relatively developed areas (with higher GVRIO per head) have more broad linkages. Most of their products are sold outside the local counties, through the nation, even to the world markets (such as the enterprises in Gongyi and Mengxian). On the contrary, the enterprises in the less developed counties are generally linked with the local markets.

Table 2 Product linkage and development level of rural industry

County	GVRIO per head		Product destinations (%)		
	in 1991 (yuan)	Local	In the province	Outside the province	Others
Gongyi	2035.7	12.0	36.0	42.0	10.0
Mengxian	1339.7	26.9	34.6	34.6	3.9
Xinan	541.4	45.0	30.0	10.0	15.0
Weishi	340.0	5.5	87.0	5.0	2.5
Ningling	99.2	80.7	6.5	9.7	3.2

Note: Product destinations are calculated on the basis of the data from 178 enterprises surveyed in 1992.

Why are linkages closely related to development of rural industry? Some internal causation can be explored:

First, through inter-regional linkages rural enterprises can occupy a larger market. This is specially important for the enterprises in the less developed provinces such as Henan because of the limited local market (Table 2). The survey result also indicated that the motives to establish enterprises were mostly for the markets outside the local areas.

Second, linkages can bring technology to rural industry. In Gongyi County most rural industry import technology from other enterprises and research institutes (Table 3). Utilizing new technology greatly promote the development of rural industry. For example, a

factory in Zhulin Village of Gongyi County imported advanced technique and employed an engineer with high wages from a Tianjin Company, and became the first producer of cyanic sodium in Henan Province, output value of the factory was 3.5 million yuan in 1991 and will grow to 30 million yuan by 1996 according to the factory's plan and the market potentials. By comparison, the technological linkage in Ningling is very weak.

**Table 3 Technology linkages and development of rural industry**

County	GVRIO per head (yuan)	Tech-linkages with city in surveyed enterprises (%)
Gongyi	2035.7	66.7
Ningling	99.2	23.5

Note: Technological linkage with city here refers to the direct linkages occurred between rural enterprises and urban organizations.

Third, interindustrial linkages can generate multiplier effect. After a key industry is set up in a rural area, through linkages the backward and forward industries will be developed. The cases can be easily found in Henan's rural industry such as in Nanjie of Linying County and Goucun Village in Mengxian.

Fourth, through linkages rural industrial enterprises can change their managerial system. It also helps to replace the traditional ideology of small-scale peasant economy with the modern industrial culture.

#### IV. SPATIAL MODELS

Three spatial models can be induced from this study:

**Model A: Key industry brings relative industries through linkages (Fig.1.A).** In the model, resource-based industry is first developed in a rural area ( $t_1$ ). When the funds for industrial development are accumulated, the entrepreneurs in the area start to seek new technology from outside. After several years, development, a key industry is built ( $t_2$ ) and through its backward and forward linkages other industries grow ( $t_3$ ). Finally the spatial industrial complex is founded ( $t_4$ ) and as its expansion continues the industry will diffuse to other areas.

**Model B: Regional specialization and linkages (Fig.1.B).** In some specialized villages, the industry is expanded mainly through technology linkage. The first factory may be set up in a village due to some locational factors ( $t_1$ ). Because the local environment is suitable for the industrial development, the profit of the first factory is increasing, and its size is expanding ( $t_2$ ). So through technology linkages other villagers follow the example and a num-

ber of factories are founded ( $t_3$ ). Inter-regional linkages also influence the industrial development, and promote using new technology and realizing large-scale production ( $t_4$ ).

Model C: Transition of major industries (Fig.1.C). At the beginning, a village may build a resource-based industry such as mining and agricultural products processing ( $t_1$ ). As funds increase and market changes, a new industry is developed which replaces the old one ( $t_2$ ). Several years later another change may occur ( $t_3, t_4$ ). After each transition, the technological content of products is stepped up. In the model, capital and technology linkages play a key role.

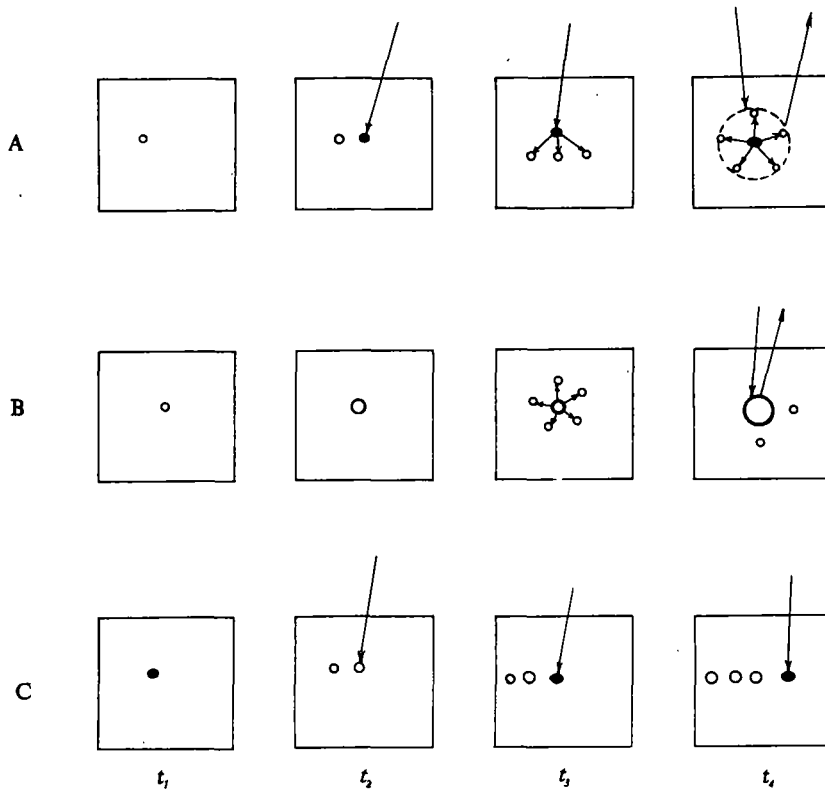


Fig.1 Possible spatial models of linkages and industrial development in rural areas

## V. A CASE STUDY: NANJIE VILLAGE IN LINYING COUNTY

Nanjie Village is located at 500 meters south of the county seat of Linying in the southern part of Henan Province. In 1991 the gross value of industrial and agricultural output (GVIAO) in the village reached 103 million yuan (34,190 yuan per head) and it is expected that GVIAO in 1992 will be doubled. That means by the end of this year GVIAO per capita in the village will exceed US \$ 10,000, and the villagers will step into a new stage

of development (according to the World Bank's data GNP per capita of the industrial market economies in 1985 was US \$ 11,810). The case is very outstanding in the inland provinces of China.

Industry contributes dominant shares in the village's development. In 1991 GVIO accounted for 97.9% of GVIAO. As Fig.2 shows, interindustrial linkages have played a key role in the industrial development. The village originally had a brickkiln and a flour mill in 1980. From the profit of the two plants, the flour mill extended to a very large scale and its flour was sold to as far as Beijing. In the contacts with a large Beijing food product factory, the leading team of the village found that food processing was not a hard work, and by doing this, flour the village produced would be directly used and parts of the food products market in Henan could be occupied. So a food product factory, the leading plant there, was established in 1986 and has expanded to the largest producer of instant noodle in China. Along with the growth of the leading factory, a number of plants were founded and extended mainly through backward linkages. For the need of packing food products, the village set up a cardboard box plant in 1987 and a Sino-Japanese joint-venture color printing plant in 1991. For the need of meat and eggs in cake-making, and also for the use of by-products (such as wheat bran), a pig farm and a chicken farm were established in 1988. In the same year, a cold storage was built for storing meat, eggs and some other materials for cake-making.

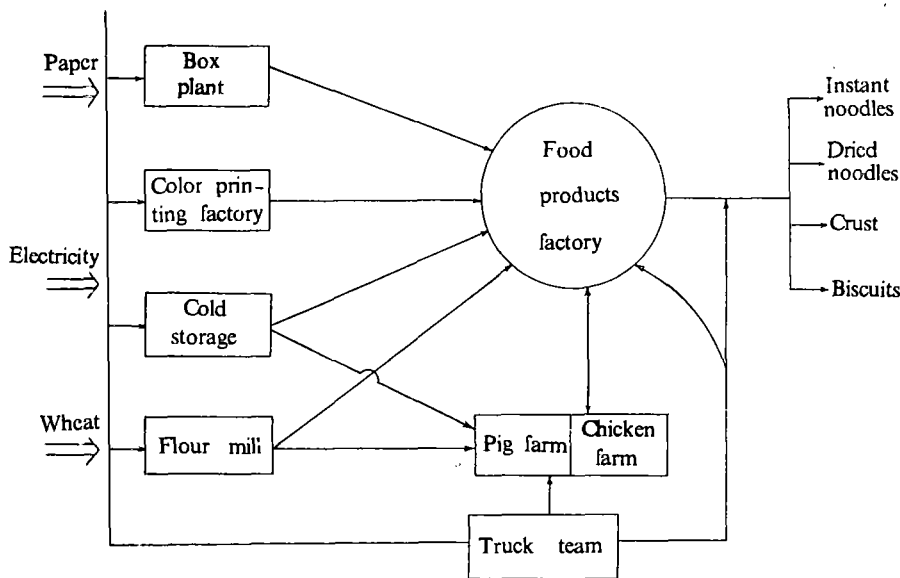


Fig.2 Linkages and industrial development in Nanjie Village

Due to the rational linkages and market potential, the production of the village increased dramatically in the past 6 years and by the end of 1995 the GVIAO in the village



will be expected to exceed 200 million yuan.

## VI. CONCLUSIONS

This study based on the enterprise surveys and interviews shows that linkages are very important in the development of rural industry: the better development of rural industry usually coincides with the broader linkages, in return, the more advanced the rural industrialization is, the more complicated linkages it needs. So promoting linkages should be included in China's rural industrialization policy.

While linkages within a region can mainly bring to multiplier effect, inter-regional (especially rural-urban) linkage can help to realize the integration of rural and urban industry. In order to change the dual structure of China's industry and prompt the industrial development in the backward areas, inter-regional linkage should be given particular attention.

Market mechanism is a major way to development of linkages, so it is necessary to complete the socialist marketing system. Meanwhile, the study also finds that bright and skillful entrepreneurs play an important role in expanding industrial linkages, and suggests the need of studying elite economy.

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